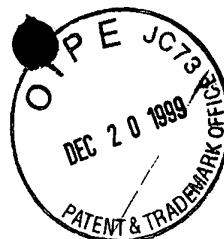SEQUENCE LISTING

<110> Irwin J. Griffith et al.

<120> T CELL EPITOPES OF RYEGRASS POLLEN ALLERGEN

<130> IMI-040CP3

<140> 08/737,904
<141> 1996-11-20

<150> 08/106,016
<151> 1993-08-13

<160> 61

<170> PatentIn Ver. 2.0

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<222> (40)..(942)

<400> 1
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                                                 Met Ala Val Gln Lys
                                                 1   5

tac acg gtg gct cta ttc ctc gcc gtg gcc ctc gtg gcg ggc ccg gcc   102
Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Leu Val Ala Gly Pro Ala
            10   15   20

gcc tcc tac gcc gct gac gcc ggc tac acc ccc gca gcc gcg gcc acc   150
Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Ala Thr
        25   30   35

ccg gct act cct gct gcc acc ccg gct gcg gct gga ggg aag gcg acg   198
Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys Ala Thr
        40   45   50

acc gac gag cag aag ctg ctg gag gac gtc aac gct ggc ttc aag gca   246
Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala
        55   60   65

gcc gtg gcc gcc gct gcc aac gcc cct ccg gcg gac aag ttc aag atc   294
Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile
70   75   80   85

ttc gag gcc gcc ttc tcc gag tcc tcc aag ggc ctc ctc gcc acc tcc   342
Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
        90   95   100

gcc gcc aag gca ccc ggc ctc atc ccc aag ctc gac acc gcc tac gac   390

47

Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp
        105   110   115

gtc gcc tac aag gcc gcc gag ggc gcc acc ccc gag gcc aag tac gac   438
Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys Tyr Asp
        120   125   130

gcc ttc gtc act gcc ctc acc gaa gcg ctc cgc gtc atc gcc ggc gcc   486
Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala
        135   140   145

ctc gag gtc cac gcc gtc aag ccc gcc acc gag gag gtc cct gct gct   534
Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu Val Pro Ala Ala
150   155   160   165

aag atc ccc acc ggt gag ctg cag atc gtt gac aag atc gat gct gcc   582
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
                        170   175   180

ttc aag atc gca gcc acc gcc gcc aac gcc gcc ccc acc aac gat aag   630
Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys
                        185   190   195

ttc acc gtc ttc gag agt gcc ttc aac aag gcc ctc aat gag tgc acg   678
Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu Cys Thr
                        200   205   210

ggc ggc gcc tat gag acc tac aag ttc atc ccc tcc ctc gag gcc gcg   726
Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala
                        215   220   225

gtc aag cag gcc tac gcc gcc acc gtc gcc gcc gcg ccc gag gtc aag   774
Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala Pro Glu Val Lys
230   235   240   245

tac gcc gtc ttt gag gcc gcg ctg acc aag gcc atc acc gcc atg acc   822
Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
                        250   255   260

cag gca cag aag gcc ggc aaa ccc gct gcc gcc gct gcc aca ggc gcc   870
Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala Ala Ala Thr Gly Ala
                        265   270   275

gca acc gtt gcc acc ggc gcc gca acc gcc gcc gcc ggt gct gcc acc   918
Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Ala Gly Ala Ala Thr
                        280   285   290

gcc gct gct ggt ggc tac aaa gcc tgatcagctt gctaatatac tactgaacgt   972
Ala Ala Ala Gly Gly Tyr Lys Ala
                        295   300

atgtatgtgc atgatccggg cggcgagtgg ttttgttgat aattaatctt cgttttcgtt   1032

tcatgcagcc gcgatcgaga gggcttgcat gcttgtaata attcaatatt tttcatttct   1092

ttttgaatct gtaaatcccc atgacaagta gtgggatcaa gtcggcatgt atcaccgttg   1152

48

atgcgagttt aacgatgggg agtttatcaa agaatttatt attaaaaaaa aaaaaaaaaa 1212

aaaaaaaaaa aaaaaaa

<210> 2
<211> 301
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<213> Lolium perenne

<400> 2

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 1               5                  10                  15

Val Ala Gly Pro Ala Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro
            20                  25                  30

Ala Ala Ala Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala
            35                  40                  45

Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn
        50                  55                  60

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala
65                  70                  75                  80

Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly
                85                  90                  95

Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu
                100                 105                 110

Asp Thr Ala Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro
            115                 120                 125

Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg
    130                 135                 140

Val Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu
145                 150                 155                 160

Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp
                165                 170                 175

Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala
            180                 185                 190

Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala
            195                 200                 205

Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro
    210                 215                 220

Ser Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala
225                 230                 235                 240

Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala
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49

245   250   255
Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala
              260   265   270

Ala Ala Thr Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala
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Ala Gly Ala Ala Thr Ala Ala Ala Gly Gly Tyr Lys Ala
      290   295   300

<210> 3
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<212> PRT
<213> Lolium perenne

<400> 3
Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Ala Thr Pro Ala Thr Pro
    1   5   10   15

Ala Ala Thr Pro
              20

<210> 4
<211> 20
<212> PRT
<213> Lolium perenne

<400> 4
Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys
    1   5   10   15

Ala Thr Thr Asp
              20

<210> 5
<211> 20
<212> PRT
<213> Lolium perenne

<400> 5
Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu
    1   5   10   15

Asp Val Asn Ala
              20

<210> 6
<211> 20
<212> PRT
<213> Lolium perenne

<400> 6

50

Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala Ala Val
1   5   10   15

Ala Ala Ala Ala
            20

<210> 7
<211> 16
<212> PRT
<213> Lolium perenne

<400> 7
Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala Asp
1   5   10   15

<210> 8
<211> 20
<212> PRT
<213> Lolium perenne

<400> 8
Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser
1   5   10   15

Glu Ser Ser Lys
            20

<210> 9
<211> 20
<212> PRT
<213> Lolium perenne

<400> 9
Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
1   5   10   15

Ala Ala Lys Ala
            20

<210> 10
<211> 20
<212> PRT
<213> Lolium perenne

<400> 10
Gly Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys
1   5   10   15

Leu Asp Thr Ala
            20

<210> 11

51

<211> 20
<212> PRT
<213> Lolium perenne

<400> 11
Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp Val Ala Tyr Lys
1   5   10   15

Ala Ala Glu Gly
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<210> 12
<211> 20
<212> PRT
<213> Lolium perenne

<400> 12
Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys
1   5   10   15

Tyr Asp Ala Phe
                20

<210> 13
<211> 20
<212> PRT
<213> Lolium perenne

<400> 13
Ala Thr Pro Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu
1   5   10   15

Ala Leu Arg Val
                20

<210> 14
<211> 20
<212> PRT
<213> Lolium perenne

<400> 14
Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala Leu Glu
1   5   10   15

Val His Ala Val
                20

<210> 15
<211> 20
<212> PRT
<213> Lolium perenne

<400> 15

52

Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu
1   5   10   15

Val Pro Ala Ala
            20

<210> 16
<211> 20
<212> PRT
<213> Lolium perenne

<400> 16
Lys Pro Ala Thr Glu Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu
1   5   10   15

Leu Gln Ile Val
            20

<210> 17
<211> 20
<212> PRT
<213> Lolium perenne

<400> 17
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
1   5   10   15

Phe Lys Ile Ala
            20

<210> 18
<211> 20
<212> PRT
<213> Lolium perenne

<400> 18
Asp Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala
1   5   10   15

Ala Pro Thr Asn
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<210> 19
<211> 20
<212> PRT
<213> Lolium perenne

<400> 19
Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe
1   5   10   15

Glu Ser Ala Phe
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53

<210> 20
<211> 20
<212> PRT
<213> Lolium perenne

<400> 20
Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu
1   5   10   15

Cys Thr Gly Gly
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<210> 21
<211> 20
<212> PRT
<213> Lolium perenne

<400> 21
Asn Lys Ala Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys
1   5   10   15

Phe Ile Pro Ser
            20

<210> 22
<211> 20
<212> PRT
<213> Lolium perenne

<400> 22
Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala Val Lys
1   5   10   15

Gln Ala Tyr Ala
            20

<210> 23
<211> 20
<212> PRT
<213> Lolium perenne

<400> 23
Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala
1   5   10   15

Pro Glu Val Lys
            20

<210> 24
<211> 20
<212> PRT

54

<213> Lolium perenne

<400> 24
Ala Thr Val Ala Ala Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala
 1   5   10   15

Ala Leu Thr Lys
              20

<210> 25
<211> 20
<212> PRT
<213> Lolium perenne

<400> 25
Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
 1   5   10   15

Gln Ala Gln Lys
              20

<210> 26
<211> 20
<212> PRT
<213> Lolium perenne

<400> 26
Ala Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala
 1   5   10   15

Ala Ala Ala Thr
              20

<210> 27
<211> 20
<212> PRT
<213> Lolium perenne

<400> 27
Ala Gly Lys Pro Ala Ala Ala Ala Ala Thr Gly Ala Ala Thr Val Ala
 1   5   10   15

Thr Gly Ala Ala
              20

<210> 28
<211> 20
<212> PRT
<213> Lolium perenne

<400> 28
Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Ala Gly Ala
 1   5   10   15

Ala Thr Ala Ala
            20

<210> 29
<211> 16
<212> PRT
<213> Lolium perenne

<400> 29
Thr Ala Ala Ala Gly Ala Ala Thr Ala Ala Ala Gly Gly Tyr Lys Ala
  1   5   10   15

<210> 30
<211> 20
<212> PRT
<213> Lolium perenne

<400> 30
Ile Ala Lys Val Pro Pro Gly Pro Asn Ile Thr Ala Glu Tyr Gly Asp
  1   5   10   15

Lys Trp Leu Asp
            20

<210> 31
<211> 20
<212> PRT
<213> Lolium perenne

<220>
<221> Xaa at position 5 may be any amino acid

<220>
<221> Xaa at position 8 may be any amino acid

<400> 31
Ile Ala Lys Val Xaa Pro Gly Xaa Asn Ile Thr Ala Glu Tyr Gly Asp
  1   5   10   15

Lys Trp Leu Asp
            20

<210> 32
<211> 20
<212> PRT
<213> Lolium perenne

<400> 32
Thr Ala Glu Tyr Gly Asp Lys Trp Leu Asp Ala Lys Ser Thr Trp Tyr
  1   5   10   15

Gly Lys Pro Thr

56

<210> 33
<211> 20
<212> PRT
<213> Lolium perenne

<400> 33
Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asn Val
 1   5   10   15

Asp Lys Ala Pro
            20

<210> 34
<211> 20
<212> PRT
<213> Lolium perenne

<400> 34
Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asp Val
 1   5   10   15

Asp Lys Ala Pro
            20

<210> 35
<211> 20
<212> PRT
<213> Lolium perenne

<400> 35
Cys Gly Tyr Lys Asp Val Asp Lys Ala Pro Phe Asn Gly Met Thr Gly
 1   5   10   15

Cys Gly Asn Thr
            20

<210> 36
<211> 22
<212> PRT
<213> Lolium perenne

<400> 36
Cys Gly Phe Asn Gly Met Thr Gly Cys Gly Asn Thr Pro Ile Phe Lys
 1   5   10   15

Asp Gly Arg Gly Cys Gly
            20

<210> 37
<211> 20

<212> PRT
<213> Lolium perenne

<400> 37
Pro Ile Phe Lys Asp Gly Arg Gly Cys Gly Ser Cys Phe Glu Ile Lys
  1   5   10   15

Cys Thr Lys Pro
              20

<210> 38
<211> 20
<212> PRT
<213> Lolium perenne

<400> 38
Ser Cys Phe Glu Ile Lys Cys Thr Lys Pro Glu Ser Cys Ser Gly Glu
  1   5   10   15

Ala Val Thr Val
              20

<210> 39
<211> 20
<212> PRT
<213> Lolium perenne

<400> 39
Glu Ser Cys Ser Gly Glu Ala Val Thr Val Thr Ile Thr Asp Asp Asn
  1   5   10   15

Glu Glu Pro Ile
              20

<210> 40
<211> 20
<212> PRT
<213> Lolium perenne

<400> 40
Thr Ile Thr Asp Asp Asn Glu Glu Pro Ile Ala Pro Tyr His Phe Asp
  1   5   10   15

Leu Ser Gly His
              20

<210> 41
<211> 20
<212> PRT
<213> Lolium perenne

<400> 41
Ala Pro Tyr His Phe Asp Leu Ser Gly His Ala Phe Gly Ser Met Ala

58

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              1              5              10              15

Asp Asp Gly Glu
                  20


<210> 42
<211> 20
<212> PRT
<213> Lolium perenne

<400> 42
Ala Phe Gly Ser Met Ala Asp Asp Gly Glu Glu Gln Lys Leu Arg Ser
    1              5              10              15

Ala Gly Glu Leu
                  20


<210> 43
<211> 20
<212> PRT
<213> Lolium perenne

<400> 43
Glu Gln Lys Leu Arg Ser Ala Gly Glu Leu Glu Leu Gln Phe Arg Arg
    1              5              10              15

Val Lys Cys Lys
                  20


<210> 44
<211> 20
<212> PRT
<213> Lolium perenne

<400> 44
Glu Leu Gln Phe Arg Arg Val Lys Cys Lys Tyr Pro Asp Asp Thr Lys
    1              5              10              15

Pro Thr Phe His
                  20


<210> 45
<211> 20
<212> PRT
<213> Lolium perenne

<400> 45
Tyr Pro Asp Asp Thr Lys Pro Thr Phe His Val Glu Lys Ala Ser Asn
    1              5              10              15

Pro Asn Tyr Leu
                  20
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<210> 46
<211> 20
<212> PRT
<213> Lolium perenne

<400> 46
Val Glu Lys Ala Ser Asn Pro Asn Tyr Leu Ala Ile Leu Val Lys Tyr
 1   5   10   15

Val Asp Gly Asp
             20

<210> 47
<211> 20
<212> PRT
<213> Lolium perenne

<400> 47
Val Glu Lys Gly Ser Asn Pro Asn Tyr Leu Ala Ile Leu Val Lys Tyr
 1   5   10   15

Val Asp Gly Asp
             20

<210> 48
<211> 20
<212> PRT
<213> Lolium perenne

<400> 48
Ala Ile Leu Val Lys Tyr Val Asp Gly Asp Gly Asp Val Val Ala Val
 1   5   10   15

Asp Ile Lys Glu
             20

<210> 49
<211> 20
<212> PRT
<213> Lolium perenne

<400> 49
Gly Asp Val Val Ala Val Asp Ile Lys Glu Lys Gly Lys Asp Lys Trp
 1   5   10   15

Ile Glu Leu Lys
             20

<210> 50
<211> 20
<212> PRT
<213> Lolium perenne

<400> 50
Lys Gly Lys Asp Lys Trp Ile Glu Leu Lys Glu Ser Trp Gly Ala Val
　1　　　　　　　　5　　　　　　　　　　10　　　　　　　　15

Trp Arg Ile Asp
　　　　　　20

<210> 51
<211> 20
<212> PRT
<213> Lolium perenne

<400> 51
Thr Pro Asp Lys Leu Thr Gly Pro Phe Thr Val Arg Tyr Thr Thr Glu
　1　　　　　　　　5　　　　　　　　　　10　　　　　　　　15

Gly Gly Thr Lys
　　　　　　20

<210> 52
<211> 20
<212> PRT
<213> Lolium perenne

<400> 52
Val Arg Tyr Thr Thr Glu Gly Gly Thr Lys Ser Glu Val Glu Asp Val
　1　　　　　　　　5　　　　　　　　　　10　　　　　　　　15

Ile Pro Glu Gly
　　　　　　20

<210> 53
<211> 20
<212> PRT
<213> Lolium perenne

<400> 53
Ser Glu Val Glu Asp Val Ile Pro Glu Gly Trp Lys Ala Asp Thr Ser
　1　　　　　　　　5　　　　　　　　　　10　　　　　　　　15

Tyr Ser Ala Lys
　　　　　　20

<210> 54
<211> 33
<212> PRT
<213> Lolium perenne

<220>
<221> Xaa's at postions 7,13,16 and 20 may be any amino acid

<400> 54

61

Ala Asp Ala Gly Tyr Thr Xaa Ala Ala Ala Ala Thr Xaa Ala Thr Xaa
1   5   10   15

Ala Ala Thr Xaa Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln
            20   25   30

Lys

<210> 55
<211> 20
<212> PRT
<213> Lolium perenne

<400> 55
Ala Lys Ser Thr Trp Tyr Gly Lys Pro Thr Gly Ala Gly Pro Lys Asp
1   5   10   15

Asn Gly Gly Ala
            20

<210> 56
<211> 20
<212> PRT
<213> Lolium perenne

<400> 56
Glu Ser Trp Gly Ala Val Trp Arg Ile Asp Thr Pro Asp Lys Leu Thr
1   5   10   15

Gly Pro Phe Thr
            20

<210> 57
<211> 1181
<212> DNA
<213> Lolium perenne

<220>
<221> CDS
<222> (53)..(961)

<220>
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                                                           Met Ala

gtg cag cag tac acg gtg gcg ctg ttc ctg gcc gtg gcc tcg tgt cgg   106
Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser Cys Arg
    -20   -15   -10

62

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gcc cgc gcc tcc tac gcc gcc gac gcc ggc tac gcc ccc gcc act ccc    154
Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro
    -5            -1  1          5              10

gcc acc ccg gct acc ccc gcg gcc cca ggc gca gcg gtg cca gca ggg    202
Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro Ala Gly
            15              20              25

aag gcg gcg acc gag gag cag aag ctg atc gag aag atc aac gcc ggc    250
Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly
            30              35              40

ttc aag gcc gcc gtg gcg gcc gcc gcg ggc gtc ccg cca ggc gac aag    298
Phe Lys Ala Ala Val Ala Ala Ala Ala Gly Val Pro Pro Gly Asp Lys
        45              50              55

tac aag acg ttc gtc gaa acc ttc ggc aag gcc tcc aac aag gcc ttc    346
Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe
        60              65              70

ctg ggg gac ctc ccg acc aac tac gcc gat gtc aac tcc agg gcc cag    394
Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln
75              80              85              90

ctc acc tcg aag ctc gac gcc gcc tac aag ctc gcc tac gac gcc gcc    442
Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala
            95              100             105

cag ggc gcc acc ccc gag gcc aag tac gac gcc tac gtc gcc acc ctc    490
Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu
            110             115             120

agc gag gcg ctc cgc atc atc gcc ggc acc ctc gag gtc cac gcc gtc    538
Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His Ala Val
            125             130             135

aag ccc gct gcc gag gag gtc aag cct atc ccc gcc gga gag ctg cag    586
Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu Leu Gln
    140             145             150

atc gtc gac aag att gac gtc gcc ttc aga act gcc gcc acc gcc gcc    634
Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr Ala Ala
155             160             165             170

aac gcc gcc ccc acc aac gac aag ttc acc gta ttc gag acc acc ttt    682
Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr Thr Phe
            175             180             185

aac aag gcc atc aag gag agc acg ggc ggc acc tac gag agc tac aag    730
Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys
            190             195             200

ttc att ccc acc ctt gag gcc gcc gtt aag cag gcc tac gcc gcc acc    778
Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr
        205             210             215

gtc gca tcc gcg ccg gag gtc aag tac gcc gtc ttt gag acc gcg ctg    826
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63

```
Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr Ala Leu
    220             225             230

aaa aag gcg gtc acc gcc atg tcc gag gcc cag aag gaa gcc aag ccc   874
Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala Lys Pro
235             240             245             250

gcc acc gcc acc ccg acc ccc acc gca act gcc gcg gcc gcg gtg gcc   922
Ala Thr Ala Thr Pro Thr Pro Thr Ala Thr Ala Ala Ala Ala Val Ala
            255             260             265

acc aac gcc gcc ccc gtc gct gct ggt ggc tac aaa atc tgatcaactc   971
Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
            270             275

gctagcaata tacacatcca tcatgcacat atagagctgt gtatgtatgt gcatgcatgc  1031

cgtggcgccg cgcaagtttg ctcataatta attcttggtt ttcgttgctt gcatccacga  1091

gcgaccgagc ccgtggatag tcgcatgtgt atgtaatttt ttctgagaaa tgtgtatatg  1151

taatatataa ttgagtacta aaaaaaaaaa                                   1181


<210> 58
<211> 279
<212> PRT
<213> Lolium perenne

<400> 58

Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro Ala Thr Pro Ala Thr Pro
  1             5              10              15

Ala Ala Pro Gly Ala Ala Val Pro Ala Gly Lys Ala Ala Thr Glu Glu
            20              25              30

Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly Phe Lys Ala Ala Val Ala
            35              40              45

Ala Ala Ala Gly Val Pro Pro Gly Asp Lys Tyr Lys Thr Phe Val Glu
    50              55              60

Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe Leu Gly Asp Leu Pro Thr
 65              70              75              80

Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln Leu Thr Ser Lys Leu Asp
                85              90              95

Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala Gln Gly Ala Thr Pro Glu
            100             105             110

Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu Ser Glu Ala Leu Arg Ile
    115             120             125
```

64

Ile Ala Gly Thr Leu Glu Val His Ala Val Lys Pro Ala Ala Glu Glu
    130   135   140

Val Lys Pro Ile Pro Ala Gly Glu Leu Gln Ile Val Asp Lys Ile Asp
145   150   155   160

Val Ala Phe Arg Thr Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn
                165   170   175

Asp Lys Phe Thr Val Phe Glu Thr Thr Phe Asn Lys Ala Ile Lys Glu
                180   185   190

Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys Phe Ile Pro Thr Leu Glu
            195   200   205

Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ser Ala Pro Glu
    210   215   220

Val Lys Tyr Ala Val Phe Glu Thr Ala Leu Lys Lys Ala Val Thr Ala
225   230   235   240

Met Ser Glu Ala Gln Lys Glu Ala Lys Pro Ala Thr Ala Thr Pro Thr
                245   250   255

Pro Thr Ala Thr Ala Ala Ala Ala Val Ala Thr Asn Ala Ala Pro Val
            260   265   270

Ala Ala Gly Gly Tyr Lys Ile
            275

<210> 59
<211> 20
<212> PRT
<213> Lolium perenne

<220>
<221> Xaa's at postions 7,13,16 and 20 may be any amino acid

<400> 59
Ala Asp Ala Gly Tyr Thr Xaa Ala Ala Ala Ala Thr Xaa Ala Thr Xaa
    1   5   10   15

Ala Ala Thr Xaa
            20

<210> 60
<211> 20
<212> PRT
<213> Lolium perenne

<220>
<221> Xaa's at postions 3,6 and 10 may be any amino acid

<400> 60

Ala Thr Xaa Ala Thr Xaa Ala Ala Thr Xaa Ala Ala Ala Gly Gly Lys
1   5   10   15

Ala Thr Thr Asp
            20

<210> 61
<211> 303
<212> PRT
<213> Lolium perenne

<400> 61

Met Ala Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser
            -20   -15   -10

Cys Arg Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala
            -5   -1 1   5

Thr Pro Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro
        10   15   20

Ala Gly Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn
25   30   35   40

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Gly Val Pro Pro Gly
            45   50   55

Asp Lys Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys
            60   65   70

Ala Phe Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg
            75   80   85

Ala Gln Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp
        90   95   100

Ala Ala Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala
105   110   115   120

Thr Leu Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His
            125   130   135

Ala Val Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu
            140   145   150

Leu Gln Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr
            155   160   165

Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr
            170   175   180

Thr Phe Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser
185   190   195   200

Tyr Lys Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala

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                205                    210                   215
Ala Thr Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr
            220                 225                 230
Ala Leu Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala
            235                 240                 245
Lys Pro Ala Thr Ala Thr Pro Thr Pro Thr Ala Thr Ala Ala Ala Ala
        250                 255                 260
Val Ala Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
265                 270                 275
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